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Aurelie Falcou

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EXAMINER

WILSON, MICHAEL H

ART UNIT

PAPER NUMBER

1794

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/563,581	<b>Applicant(s)</b> FALCOU ET AL.	
	<b>Examiner</b> MICHAEL WILSON	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 22 May, 2009 has been entered.

2. This Office action is in response to Applicant's amendment filed 22 May, 2009, which amends claims 1, 5, and 6.

Claims 1-17 are pending.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-10, 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. (US 6,097,147) in view of Ueda et al. (US 2002/0122900).

Regarding claims 1, 5-7, Baldo et al. disclose an organic electroluminescent device comprising an anode, a cathode (column 3, lines 20-30) and at least one emission layer comprising at least one matrix material which is doped with at least one phosphorescent emitter (column 6, lines 10-11), wherein at least one hole blocking layer is incorporated between the emission layer and the cathode (column 3, lines 20-30). The reference further discloses that the material used for the hole blocking layer need only have a larger band gap than the energy level of the excitons formed in the emission layer (column 4, lines 25-29) and discloses NPD, Alq<sub>3</sub> BCP and CBP as suitable materials for a hole blocking layer (column 4, lines 25-29). However the reference does not explicitly disclose spirobifluorenes of formula (1) as a material for the hole blocking layer.

Ueda et al. teach spirobifluorenes ([0060] and specifically structural formula 1 page 7, and structural formulae 4 and 5, page 9) as blue emitting electron transporting compounds suitable for use in an organic electroluminescent device [0060]. The compounds of Ueda et al correspond to the instant formula where aryl is biphenyl, naphthyl, or anthracene, n and m are both 1, and p and o are both 3 ([0026], structural formula 1 page 7, and structural formulae 4 and 5, page 9).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the compounds of Ueda et al. in the hole blocking layer of Baldo et al. One of ordinary skill in the art given the teaching of Baldo et al. that the hole blocking layer need only have a large band gap and that CBP, a blue emitting compound, as is disclosed as suitable for the hole blocking layer would reasonably expect the spirobifluorene compounds of Ueda et al., which are taught as blue-emitters, to also be suitable. Blue emitting compound inherently have a large bandgap because of the high energy required for blue light. One of ordinary skill in the art would also expect the compounds of Ueda et al. to be suitable teaches that these blue emitting compounds are electron transporting (Ueda [0077]). One of ordinary skill would be motivated by a desire to optimize the hole blocking layer in a device and guided in the selection of a specific compound for the hole blocking layer by the disclosure of Baldo et al. that the material used for the hole blocking layer need only have a larger band gap than the energy level of the excitons formed in the emission layer (column 4, lines 29-34).

Regarding claims 2, 10, and 12-14, modified Baldo et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein:

- a hole injection layer and/or a hole transport layer and/or an electron injection layer and/or an electron transport layer and optionally further layers are present (column 3, lines 60-65)
- the layer thickness of the hole blocking layer is 8 nm (column 6, lines 12-13);
- the matrix material is a carbazole compound (column 5, line 43);

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- the phosphorescent emitter is a complex of Al, Ga, In, Sc, Sn, Rh, Ir, or Pt (column 4, lines 44-65; column 5, lines 9-10 and 45);
- the phosphorescent emitter contains at least one element from the group of rhodium, iridium, or platinum (column 4, lines 44-65; column 5, lines 9-10 and 45);

Regarding claims 3 and 4, modified Baldo et al. disclose all the claim limitations as set forth above. Additionally the reference only discloses the hole blocking material as forming the hole blocking layer (column 4, lines 25-29; column 6, lines 12-13). While the reference does not explicitly disclose the % composition of the hole blocking layer no other material is disclosed for use within the layer. Therefore, it would be readily apparent to one of ordinary skill at the time of the invention that the hole blocking layer may consist only of the hole blocking material.

Regarding claims 8-9, modified Baldo et al. disclose all the claim limitations as set forth above. While the reference is silent to the glass transition temperature the compounds disclosed by Ueda et al. being within the formula claimed by applicant, the glass transition temperature of compounds would be expected inherently to have the same properties as disclosed by applicant. Recitation of a newly disclosed property does not distinguish over a reference disclosure of the article or composition claims. *General Electric v. Jewe Incandescent Lamp Co.*, 67 USPQ 155. *Titanium Metal Corp. v. Banner*, 227 USPQ 773. Applicant bears responsibility for proving that reference composition does not possess the characteristics recited in the claims. *In re Fitzgerald*, 205 USPQ 597, *In re Best*, 195 USPQ 430.

Regarding claims 15-17, modified Baldo et al. disclose all the claim limitations as set forth above. The reference further discloses several methods of forming the organic electroluminescent layers including deposition, thermal evaporation, spin coating, electron-beam evaporation, and sputtering. The reference does not explicitly disclose organic vapor deposition or a printing process for forming the layers.

However, the patentability is determined by the recited structure of the device and not by a method of making. The examiner notes that even though a product-by-process is defined by the process steps by which the product is made, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). As the court stated in *Thorpe*, 777 F.2d at 697, 227 USPQ at 966 (The patentability of a product does not depend on its method of production. *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969). If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.).

Regarding claim 18, modified Baldo et al. disclose all the claim limitations as set forth above. The reference also discloses wherein the device is part of a laser device (column 5, lines 65-66).

6. Claims 11, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. (US 6,097,147) in view of Ueda et al. (US 2002/0122900) as applied to claim 1 above, and further in view of Fukuoka et al. (US 2001/0000943 A1).

Regarding claim 11, modified Baldo et al. disclose all the claim limitations as set forth above. The reference does not explicitly disclose wherein the hole blocking layer directly adjoins the cathode or the electron injection layer without use of an electron transport layer.

Fukuoka et al. et al. teach a luminescent layer directly adjacent to an electron injection layer ([0165]-[0166]).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the luminescent/electron injection layer structure of Fukuoka et al. with the device of modified Baldo et al. Both references disclose similar electroluminescent devices. One of ordinary skill in the art would reasonably expect such a structure to be suitable for the device of Baldo et al as Fukuoka et al. teach an electron injection layer directly connected to the luminescent layer in a similar electroluminescent device. Further one of ordinary skill in the art would be motivated to use an electron injection layer without an additional transporting layer by a desire to simplify the device while improving electron injection.

Regarding claim 15 and 16, modified Baldo et al. disclose all the claim limitations as set forth above. While the reference discloses methods of deposition as preferred methods of forming an electroluminescent device such as electron beam evaporation and spin coating, the reference does not explicitly disclose organic vapor phase deposition (column5, lines 45-53).

Fukuoka et al. teach vapor deposition as the method of forming organic layers in a similar electroluminescent device [0261]. Fukuoka et al. teach a vapor deposition

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method, sputtering method, EB (Electron Beam) method, MBE (Molecular Beam Epitaxy) method, LB (Langmuir Blodgett) method, CVD (Chemical Vapor Deposition) method, and spin coat method as equivalent methods of forming layers that are interchangeable [0241].

It would be obvious to one of ordinary skill in the art at the time of the invention to use vapor deposition as taught by Fukuoka et al. for the device of Baldo et al. One of ordinary skill in the art would readily recognize that organic vapor phase deposition would be suitable given the teachings of Fukuoka et al. Such a use of the method would amount to nothing more than use of a known method in a known environment to produce entirely expected results.

Regarding method limitations in claims 15 and 16, the recitation of a method of sublimation or deposition, the examiner notes that the determination of patentability is determined by the recited structure of the apparatus and not by a method of making said structure. A claim containing a recitation with respect to the manner in which a claimed apparatus is made does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. (US 6,097,147) in view of Ueda et al. (US 2002/0122900) as applied to claim 1 above, and further in view of Igarashi (US 6,299,796 B1).

Regarding claim 17, modified Baldo et al. disclose all the claim limitations as set forth above. The reference further discloses several methods of forming the organic

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electroluminescent layers including deposition, thermal evaporation, spin coating, electron-beam evaporation, and sputtering (column 5, lines 45-53). However the reference does not explicitly disclose printing as a method of forming layers.

Igarashi teaches spin coating and printing methods as suitable methods for forming layers in electroluminescent devices (column 12, lines 53-58). The reference discloses the methods as equivalent methods.

It would be obvious to one of ordinary skill in the art at the time of the invention to use a printing method to form layers in the device of Baldo et al. Both references disclose similar electroluminescent devices. One of ordinary skill in the art would recognize printing methods as suitable for forming layers in the device of Baldo et al. as Igarashi teaches deposition or printing methods are suitable. The use of a printing method in the device of Baldo et al. would amount to nothing more than use of a known method in a known environment to produce entirely expected results.

Regarding method limitations in claim 17, the recitation of a method of applying layers, the examiner notes that the determination of patentability is determined by the recited structure of the apparatus and not by a method of making said structure. A claim containing a recitation with respect to the manner in which a claimed apparatus is made does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim.

***Response to Arguments***

8. Applicant's arguments filed 22 May, 2009 have been fully considered but they are not persuasive.

Applicants argue that the evidence of unexpected results (page 17, table 1 of the specification) is commensurate with the scope of amended claim 1. The data gives evidence for two complexes of instant formula (1), both compounds have biphenyls as Aryl. A showing of unexpected results for a single member of a claimed subgenus, or a narrow portion of a claimed range would be sufficient to rebut a *prima facie* case of obviousness if a skilled artisan “could ascertain a trend in the exemplified data that would allow him to reasonably extend the probative value thereof.” *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980) (Evidence of the unobviousness of a broad range can be proven by a narrower range when one skilled in the art could ascertain a trend that would allow him to reasonably extend the probative value thereof.). But see, *Grasselli*, 713 F.2d at 743, 218 USPQ at 778 (evidence of superior properties for sodium containing composition insufficient to establish the non-obviousness of broad claims for a catalyst with “an alkali metal” where it was well known in the catalyst art that different alkali metals were not interchangeable and applicant had shown unexpected results only for sodium containing materials); *In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978) (evidence of superior properties in one species insufficient to establish the nonobviousness of a subgenus containing hundreds of compounds); *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA

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1972) (one test not sufficient where there was no adequate basis for concluding the other claimed compounds would behave the same way), also see MPEP 2145.

In this case the evidence of unexpected results could reasonably be extended by one of ordinary skill in the art to compounds wherein Aryl are similar small aromatic compounds which would be expected to have similar electronic effects on the fluorene such as phenyl, naphthyl, anthryl, and terphenyl. However for other larger aromatic groups within the scope of the present claims such as pyrenyl or coronenyl one of ordinary skill in the art would not extend the results of phenyl (biphenyl) compounds to reasonably predict results with these larger ring systems because the significantly larger and more delocalized pi-cloud of larger ring systems would significantly change the electronic effects of the aryl substituent. Therefore the evidence is not considered to be commensurate with the scope of the present claims.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

MHW